FIG.1

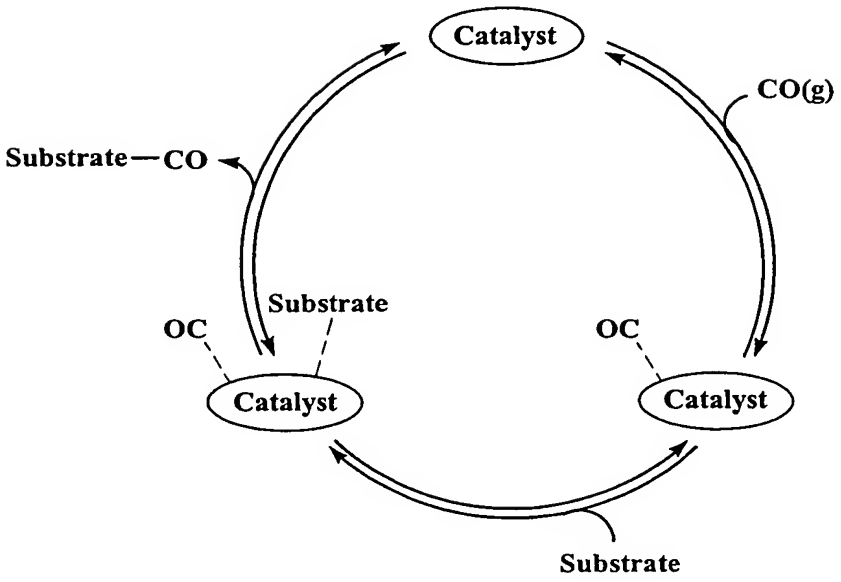
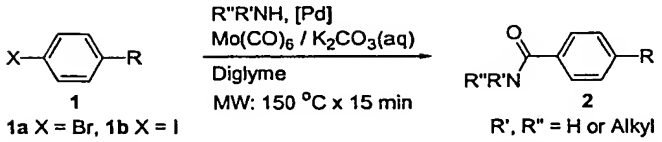
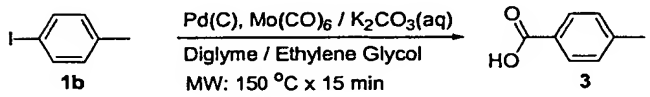


FIG.2A



Microwave-assisted palladium-catalyzed amidation utilizing in situ generated carbon monoxide from $Mo(CO)_6$.



Microwave-assisted palladium-catalyzed generation of *p*-methyl benzoic acid from tolyl iodide utilizing in situ generated carbon monoxide from $[Mo(CO)_6]$.

[a]Average isolated yields from 2-3 runs (0.23 mmol scale, SmithSynthesizer™, >95% by GC/MS). [b]*p*-Methyl-benzoic acid . Ethylene glycol was added as co-solvent.

entry, aryl-X	R-group	nucleophile	product	yield[a] (%)
1, **1a**	MeO-	*n*-$BuNH_2$	**2a**	70
2, **1a**	Me-	*n*-$BuNH_2$	**2b**	71
3, **1a**	F_3C-	*n*-$BuNH_2$	**2c**	75
4, **1a**	Ac-	*n*-$BuNH_2$	**2d**	77
5, **1a**	MeO-	Piperidine	**2e**	65
6, **1a**	Me-	Piperidine	**2f**	66
7, **1a**	F_3C-	Piperidine	**2g**	74
8, **1a**	Ac-	Piperidine	**2h**	83
9, **1a**	Me-	Benzyl amine	**2i**	48
10, **1b**	MeO-	*n*-$BuNH_2$	**2a**	69
11, **1b**	Me-	*n*-$BuNH_2$	**2b**	72
12, **1b**	F_3C-	*n*-$BuNH_2$	**2c**	78
13, **1b**	Ac-	*n*-$BuNH_2$	**2d**	79
14, **1b**	MeO-	Piperidine	**2e**	66
15, **1b**	Me-	Piperidine	**2f**	69
16, **1b**	F_3C-	Piperidine	**2g**	75
17, **1b**	Ac-	Piperidine	**2h**	76
18, **1b**	Me-	Water	**3**	87[b]

FIG.2B

4-Acetyl-*N*-*n*-butyl-benzamide (2d). White crystals. ^{1}H NMR (19 °C, TMS): δ7.90 (d, 2H; Aryl), 7.77 (d, 2H; Aryl), 6.4 (bs, 1H; CONH), 3.39 (q, 2H; N-CH_2), 2.45 (s, 3H; $COCH_3$), 1.54 ppm (m, 2H; CH_2), 1.33 (m, 2H; CH_2), 0.89 (t, 3H; CH_3); ^{13}C NMR ($CDCl_3$, 25 °C, TMS): δ197 (CO), 166 (CONH), 138,9 (C-ipso), 138,7 (C-ipso), 128 (C-HAryl), 127 (CHAryl), 40 (C-aliphatic), 31 (C-aliphatic), 27 (C-aliphatic), 20 (C-aliphatic), 14 (C-aliphatic). MS (70 eV): m/z (%): 219 (10) [M^+], 177 (25), 147 (100). Elemental Analysis: Calculated for $C_{13}H_{17}NO_2$: C, 71.2; N, 6.4; H, 7.8; Found: C, 71.6; N, 6.3; H, 7.9 .

4-Trifluoromethylphenyl-piperidin-1-yl-methanone (2g). Yellow oil. ^{1}H NMR (19 °C, TMS): δ7.66 (d, 2H; Aryl), 7.48 (d, 2H; Aryl), 3.75 (bs, 2H; CH_2), 3.32 (bs, 2H; CH_2), 1.67 (bs, 4H; CH_2), 1.52 (bs, 2H; CH_2); ^{13}C NMR (25 °C, TMS): δ 168 (CO), 140 (C-ipso), 131 (q; CF_3), 127 (CHAryl), 126 (CHAryl), 122 (C-ipso), 49 (broad, C-aliphatic), 43 (broad, C-aliphatic), 27 (broad, C-aliphatic), 26 (broad, C-aliphatic), 24 (C-aliphatic). MS (70 eV): m/z (%): 256 (80) [M+-1], 173 (100), 145 (75). Elemental Analysis: Calculated for $C_{13}H_{14}F_3NO \times ½H_2O$: C, 58.6; N, 5.3; H, 5.7; Found: C, 58.8; N, 5.1;

FIG.3

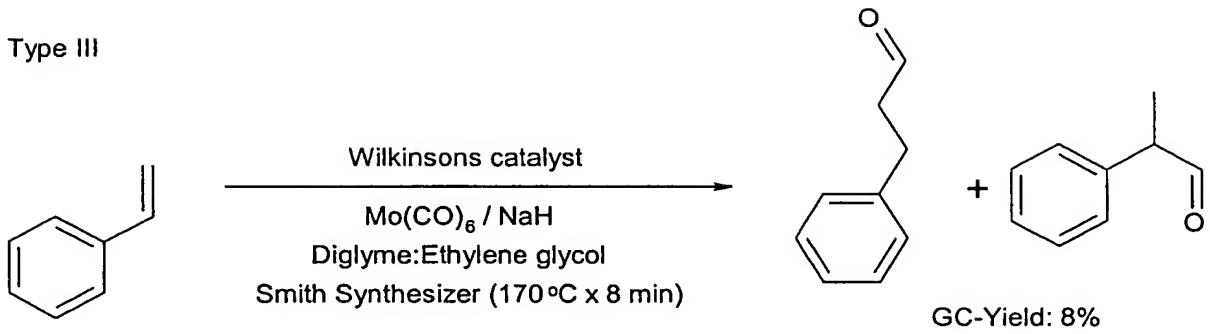
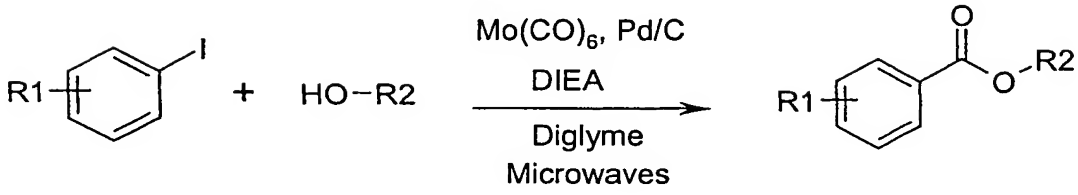


FIG.4



1a-c **2a-d** **3a-f**

R1		R2		Time (s)	Conversion of 1[a]	Isolated Yields (%) of 3	
1a	4-OMe	**2a**	-nBu	300	90%	**3a**	**75%**
1b	2-Me	**2a**	-nBu	300	Full	**3b**	**46%**
1a	4-OMe	**2b**	-*t*Bu	900	Full	**3c**	**38%**
1a	4-OMe	**2c**	$-CH_2Ph$	900	b	**3d**	**36%**
1a	4-OMe	**2d**	$-CH_2CH_2Si(Me)_3$	900	Full	**3e**	**65%**
1c	$4-CF_3$	**2d**	$-CH_2CH_2Si(Me)_3$	900	Full	**3f**	**65%**

[a]Measured with GC-MS on crude products. [b]not detected with GC-MS.

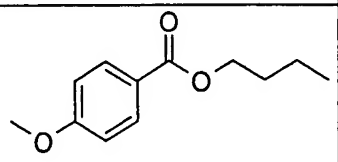
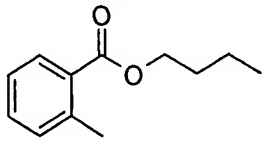
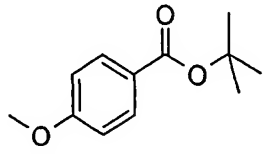
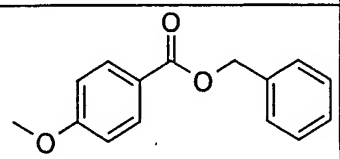
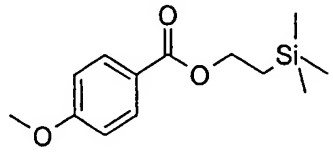
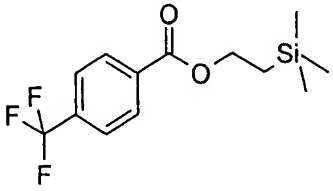
Number	Structure	Name
3a		Butyl-4-methoxybensoate
3b		Butyl-4-methylbensoate
3c		*t*-Butyl-4-methoxybensoate
3d		Bensyl-4-methoxybensoate
3e		(2-trimethylsilanylethyl)-4-methoxybensoate
3f		(2-trimethylsilanylethyl)-4-trifluoromethylbensoate

FIG.5

REPLACEMENT SHEET

FIG.6